near that date the mercury registered 20° below, but at noon it was 30° above, or a rise of 50° in five hours.

1875. November 30, the mercury remained below zero all day, the only such record occurring during forty-five years, and, according to Reuben Pierce's "Annals of the Weather," it was the only such record for November for eighty years past.

1880. June 25, the mercury registered 100°.

During the year 1894, three conditions of the weather were recorded, unparalled during the forty-five years.

a. March was very mild and open, scarcely any freezing weather during the first three weeks.

b. The drought of mid-summer was the most severe on record.

c. There was a week of good sleighing during the first half of November.

My record of snowfall shows that the average per winter on the hills in this neighborhood was nearly 8 feet. The winter of 1856–57 gave nearly 12 feet, while the winter of 1899–1900 gave 42 inches. The latter is the smallest on my record, the next larger was 4 feet 2 inches in 1857–58. The winter of 1898–99 gave 141 days of continuous sleighing. The winter of 1899–1900 gave the largest number of days of icy and slippery traveling. The snow blizzard of March 12–14, 1888, the dark day of September 6, 1881, and the extensive disastrous flood of October 4, 1869, are all indelibly impressed upon the mind. During the winter of 1868–69, the lowest extremes of temperature occurred in December and in March.

August is generally a hot, dry month, but in August, 1856, two freshets occurred, caused by heavy rainfalls.

I have seen frosts every month in the year, and killing frosts every month except July.

In the face of these climatic changes we are told that the West and South present much more severe and sudden changes than the climate of New England.

INTERNATIONAL SEISMOLOGICAL ASSOCIATION.

Up to the present time the MONTHLY WEATHER REVIEW has published items bearing on earthquakes, partly because of the general interest in this subject and because of the good records kept by meteorological observers, partly also because we have no journal especially devoted to this subject. At the recent International Conference at Strassburg, Prof. H. F. Reid, of Johns Hopkins University, was present as the official delegate from the United States, and more especially from the United States Geological Survey. He reports that the conference decided upon a form of organization for an international seismological association. The principal features of this association will be the formation of a central bureau for the collection, study, and publication of the reports sent from various countries, and the establishment of local bureaus and local seismological observatories in all parts of the world. A general assembly of delegates will meet at least once in four years. The expenses of the association will be met by contributions from each cooperating nation. A general report as to the instruments best adapted for recording earthquakes will be prepared, but meanwhile each observatory will select its own. It was unanimously decided that in describing earthquakes, and especially in the published official reports of the association, Greenwich mean civil time should be used. Those who are interested in this subject should correspond directly, either with Prof. Harry Fielding Reid of the Johns Hopkins University, Baltimore, Md., or with Professor Dr. Gerland, Director of the Central Seismological Station, Strassburg, Germany.

METEOROLOGY IN HAWAII.

The Governor of the Territory of Hawaii, Hon. G. R. Carter, under date of December 12, 1903, announces that—

The revenues of the territory have been reduced more than one-half, and it will be practically impossible to continue the maintenance of the meteorological service. Much as we should like to prevent a break in the records, yet absolute necessity will force us to discontinue the service. Economy must be practised in every department, and we can not continue the salary even of Mr. Lydecker as territorial meteorologist.

In reply to this communication, the Secretary of Agriculture has written as follows:

In answer to your letter of December 12, 1903, I have the honor to say that my estimates for the support of the Weather Service for the fiscal year beginning July 1, next, provide a sufficient sum to enable us to establish in the Hawaiian Islands a section of the Climate and Crop Service of the Weather Bureau. I am of the opinion that favorable action on these estimates will be taken by Congress. If so, immediately after the first of July next, an official from the Weather Bureau, with an assistant, will be sent to open an observatory at Honolulu. I shall then be glad to have such apparatus as you possess turned over to our representative, which I understand from your communication it is your desire to do. I am of the opinion that a weekly report of the condition of crops should be made and published, the same as is done for each one of our States, and that a monthly publication should be made on the climate of the islands. All this will be undertaken as soon as the means are put at our command.

Notwithstanding the foregoing it is hoped that the Hawaiian government may be able to keep up the meteorological records until the United States Government can relieve it of the work, probably next July. The surveyor general of Hawaii, Mr. E. Wall, is compiling a series of large maps of the archipelago, showing especially the location and elevations of the meteorological stations and other points of scientific interest.

INFLUENCE OF CONTINENTS AND OCEANS ON THE ATMOSPHERE.

In connection with his article in the MONTHLY WEATHER REVIEW, December, 1901, on the physical basis of long-range forecasting, the Editor has been asked how one can express in mathematical language, either analytical or graphic, the character of the different influences exerted on the atmosphere by the land and water, especially the land and water hemispheres there spoken of. Now it is evident that the action of the land differs from that of the ocean in three general respects: thermal, hygrometric, and mechanical, and the following points are to be considered:

1. The atmosphere above the land has a temperature by day higher than that above the water, and the laws expressing this are given in Professor Ferrel's Professional Paper of the Signal Service, No. 13, "Temperature of the Atmosphere and the Earth's Surface."

2. The atmosphere receives far more moisture from the ocean than from the land and the forests on the land, and even more than it does from the snow and ice that cover a portion of the land.

3. This superior content of moisture implies also higher specific heat and a vastly higher content of latent heat, all of which affects its subsequent behavior and phenomena.

4. The movement of the atmosphere over the land with its very irregular surface, is retarded far more than is its movement over the ocean. Even if the land be a smooth plain, a special form of increased resistence is introduced by the fact that during the daytime the heated air rises with a sluggish horizontal movement, and is replaced by descending air having more rapid horizontal movement. This sluggish air is, therefore, an obstacle to the rapidly moving air, not only near the ground, but also at the upper heights to which it rises. There is, therefore, a diurnal periodicity in the horizontal movement of the atmosphere; the latter is at low levels greatest in the middle of the day, but at high levels greatest in the night time. In the process of pushing sluggish air forward the rapidly moving currents convert a part of their kinetic energy into static pressure, and this gives rise to some of the terms in the so-called diurnal oscillation of the barometer. In general, as the air is slightly viscous, we represent the force required for an upper layer to slide over a lower layer by the term for viscosity introduced into the ordinary hydrodynamic equations, whose coefficient is μ (see p. 558, MONTHLY WEATHER REVIEW, December, 1901). Strictly speaking, viscosity is of slight importance, but if we consider the coefficient μ to be itself the summation of several terms, representing, respectively, (*a*) viscosity; (*b*) retardation due to vertical movements caused by orography, producing a mixture of swift upper with slower lower currents; (*c*) retardation due to vertical movements caused by local differences of temperature, producing the same mixture as in *b*; (*d*) retardation due to local differences of moisture; (*e*) that due to local falling rain (since that also is a mass that